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Meridian Internet Telephony Gateway (ITG) Line 2.2 introducing the i2050 Software Telephone, and i2004 Internet Telephone product enhancements

Nortel Networks is pleased to announce Meridian ITG Line 2.2 – marking the introduction of the i2050 software telephone, i2004 Internet Telephone enhancements, and further system improvements.

With the robust feature set of a traditional digital telephone coupled with simplified management of Moves, Adds and Changes, IP Telephony provides the customer with choice and flexibility in providing telephony services to campus & distributed users. The i2050 software telephone is especially targeted at mobile users, full time or casual road warriors, casual work-at-home, full time remote workers, and Enterprise end-users looking for convenient telephony access from their PC or laptop computer. The USB Audio Kit provides a stable audio environment important for enterprise class communications.

New and Changed Information

Large sections from the previous product bulletin are included in this product bulletin for completeness. Those familiar with the Meridian and Succession CSE1000 portfolio of products may find it useful to review sections containing new information, highlighted below.

- Overview of new functionality:
 - Product Description – new functionality (page 2)
 - Compatibility Matrix for new functionality (page 2)
 - i2050 Product Overview (page 3)
 - i2004 Enhancements (page 5)
 - Use of TCP as the transport protocol on the ELAN
 - Addition of a shift key to provide an additional 6 feature keys on the i2004 / i2050
 - Addition of password protection for TN entry on the i2004 / i2050
- Packaging and product codes (page 9)
- Software Downloads & Documentation distribution options (page 12)

Product Description

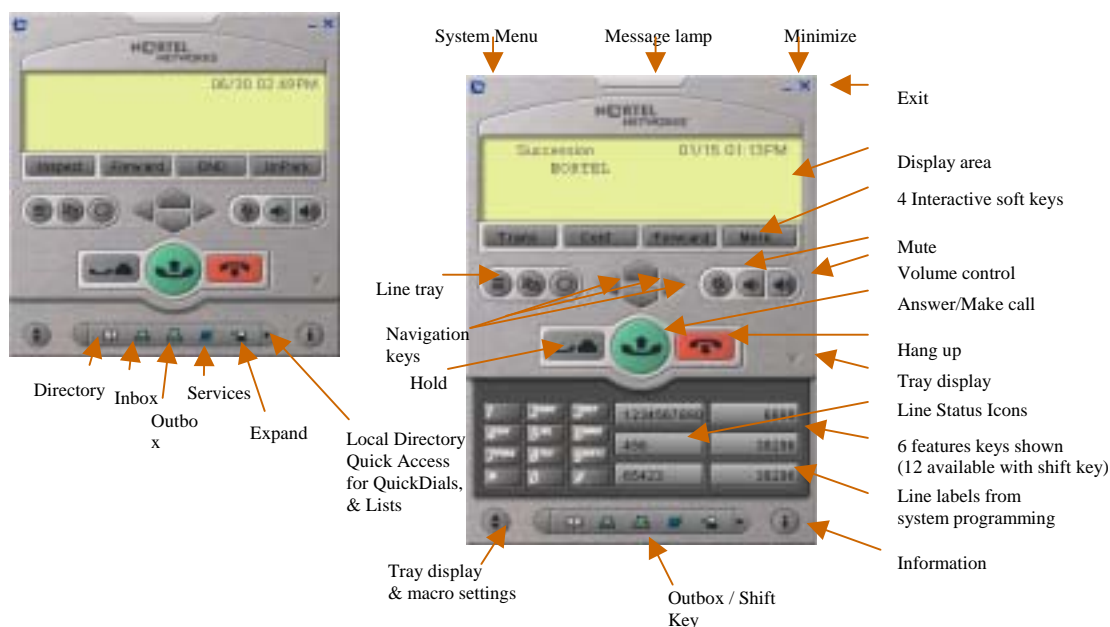
Coupled with new capability provided in Meridian 1 X-11 Rls. 25.40 and Succession Communication Server for Enterprise 1000 Rls 1.1, the ITG Line (ITGL) 2.2 delivers our new i2050 software telephone application, i2004 Internet Telephone enhancements, and provides further system & product improvements. The following table summarizes the new key functionality enabled by ITG Line 2.2, and a compatibility matrix for backward compatibility across Meridian and Succession CSE1000 platforms.

	Meridian 1 X-11 Rls 25.40,	Meridian 1 Prior X11 S/W (25.30)	Succession CSE 1000 Rls 1
Support of i2050 soft client (PC software telephone)	Yes	No	No
Support for i2004 firmware version 1.2	Yes	Yes	Yes
Addition of a shift key to provide an additional six feature keys	Yes	No	No
Addition of password protection for TN entry at the i2004 / i2050	Yes	Yes	Yes
Use of TCP as the transport protocol on ELAN	Yes	No	No

i2050 Software Telephone Overview

The i2050 software telephone is a PC based telephone with an attractive, easy to use graphical user interface. It provides quick access to Meridian features including Voice mail, Message Waiting Indication, Hold, Transfer, Conference, Calling Party Name and Number Display. Targeted at mobile users, casual work-at-home, full time remote workers, and those looking for an addition or alternative to a desktop telephone – the i2050 provides easy access to corporate & personal directory applications already on your desktop, like Outlook, and enhances your PC with feature rich telephony capabilities. The USB Audio Kit provides a stable audio environment important for enterprise class communications.

The i2050 Software Telephone Application



A Summary of Features & Capabilities of the i2050 Software Telephone

- ✓ encapsulates the operation of the i2004 Internet Telephone, providing all i2004 functionality
- ✓ once connected, provides access to Meridian 1 or Succession CSE 1000 call server telephony features
- ✓ presents an intuitive interface
- ✓ slide out trays for access to frequently used features & services, viewable line status
- ✓ shift key for additional 6 feature or line keys
- ✓ has multilingual interface (Prompts and system help available in 12 languages including English, French, Spanish, German, Italian, Swedish, Danish, Dutch, Norwegian)
- ✓ includes a directory application which provides "one-click" direct dialing, access to a variety of directory types, quick dial lists - from the main interface and the system tray interface
- ✓ allows users to customize the interface and directories
- ✓ interfaces with TAPI applications such as Outlook and ACT!
- ✓ can be operated from the Windows system tray, allowing the user to take and place calls without interrupting other work
- ✓ provides immediate answers to user questions through online help
- ✓ provides programmable macro functions for programming lengthy dialing patterns
- ✓ hotkeys map the computer keyboard to application buttons
- ✓ USB Headset Kit provides a high quality audio environment
- ✓ user selectable ringing device to alert the user to incoming calls thru speakers when the headset is not being worn

Minimum PC & System Requirements to support i2050 Software Telephone

- Pentium Pro 200 multimedia PC (or equivalent)
- Windows 98, Windows 98SE or Windows 2000
- 64 Mbytes RAM (Win98) or 128 Mbytes RAM (Win2000)
- 55 MB Free hard-drive space (all languages)
- USB port
- USB Audio Kit

USB Audio Kit

The USB Audio Kit has been engineered to provide a controlled audio interface that meets TIA-810, the industry standard that defines acceptable VoIP voice quality and defines certain audio performance standards. The USB Audio Kit helps to establish a predictable loss & level plan for quality audio performance, a requirement of TIA-810 and FCC part 68 and its international equivalents. Adhering to it guarantees the correct audio transmit and receive levels, distortion, frequency response and echo return loss, and correctly limits peak acoustic pressure. The kit also allows the i2050 software telephone to meet ADA requirements for the hearing impaired.

Use of the USB Audio Kit is currently the only supported audio interface for the i2050 Software Telephone. The USB Audio Kit provides a high quality voice environment, providing stability not possible across the wide range of sound cards available today. It is plug & play and uses standard Windows drivers, requiring no additional drivers or software since it auto-configures in the supported operating systems.

USB Audio Kit

- ✓ High quality predictable audio interface for i2050
- ✓ Fully compliant with version 1.1 of the USB Device Specification and Windows Plug & Play specifications

Kit consists of:

- ✓ USB Audio Adapter – see picture below
- ✓ Enterprise Telephony grade monaural headset
- ✓ Lower cordset with quick disconnect
- ✓ USB cable
- ✓ User guide
- ✓ Travel bag



i2050 and ACD Environments

The i2050 has been successfully tested for use in a Call Center environment both as an agent and a supervisor. We are expanding our trials of the i2050 in Call Center environments to include more sites and configurations. If you have a customer who is interested in using the i2050 in a Call Center, or would like to participate in a Call Center trial with the i2050, please have your Nortel representative contact David Murray (murraydv@nortelnetworks.com).

i2050 and i2004 Feature Enhancements & Product Improvements with ITG Line 2.2

In addition to the features and functionality initially introduced with the i2004 (described below), the following enhancements for the i2004 and i2050 are introduced with ITG Line 2.2:

Shift Key that supports 6 extra feature or line keys

- Pressing the Outbox / Shift key on the i2004 & i2050 provides easy access to 6 additional keys for more user defined features, quickdials, or line appearances.

Password Protected TN Entry

- Adds Craftsperson Node Level TN Entry Password protection
- Prevents casual access to set's TN
- When PW is configured, user is prompted for Node ID and PW during registration, before TN field is displayed

Reliability & Robustness Improvements

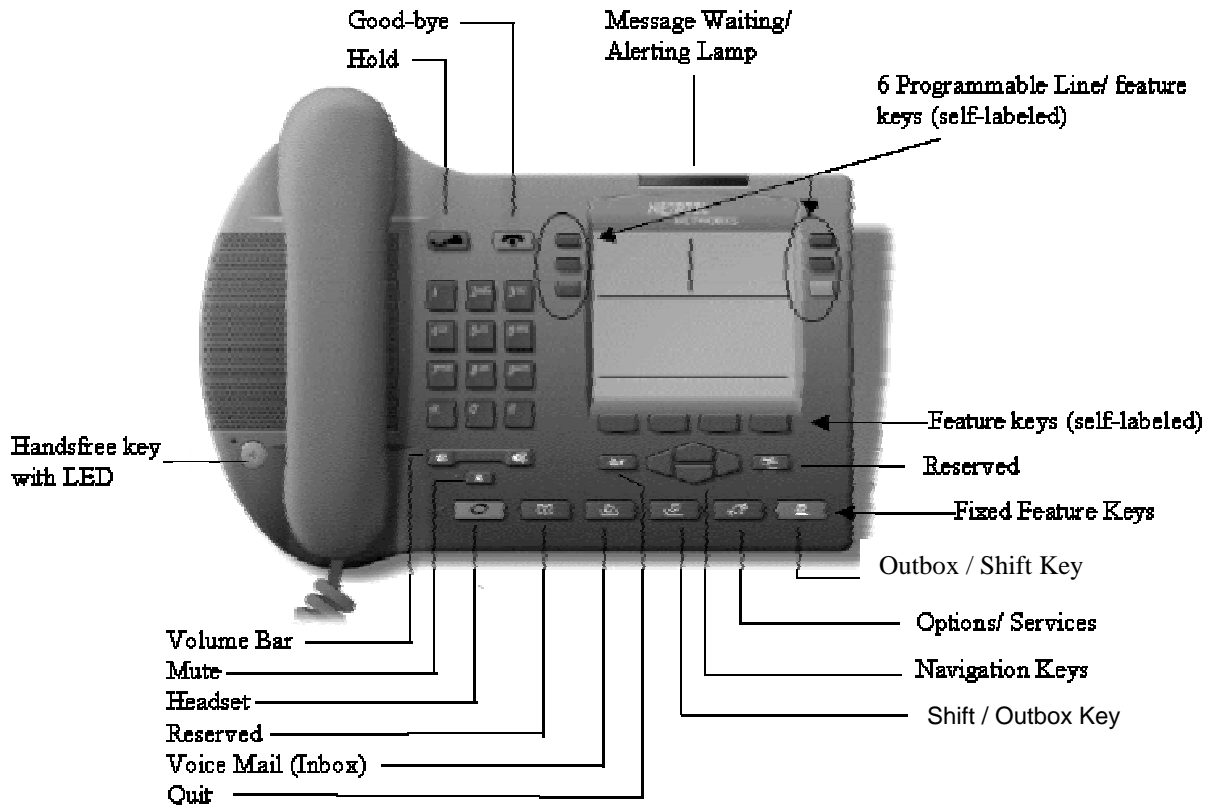
- Increased maximum DHCP packets size to accommodate additional vendors' DHCP server attributes
- Addition of a software filter to add robustness against multicast and broadcast message storms
- Implemented a check to avoid duplicate IP addresses at start-up
- Improved support for the hearing impaired including frequency shaping and increased side-tone loss for high noise environments
- Reliability & robustness improvements, including enhancements to error recovery to address known problem reports

i2004 Internet Telephone Capabilities, Features, Functionality

This section describes the existing i2004 functionality generally available on ITG 2.0 Line and above.

For intuitive ease of use, the i2004 provides end-users a professional IP-based desktop solution with a familiar interface and feature set. The i2004 will support the robust feature set of whichever specific Nortel Networks communications platform it is running on. On Meridian 1 and Succession CSE1000 systems, i2004 will initially support the full Meridian 1 digital telephone feature set currently available on the M2616 series telephone.

i2004 Internet Telephone



Automatic Configuration through DHCP

For configuration of the telephone a Dynamic Host Configuration Protocol (DHCP) server may be used to provide information that enables the i2004 Internet Telephone network connection, and connection to the Internet Telephony Gateway Line card. Static IP configuration is also possible using the dial pad on the i2004 to enter the IP configuration information.

Features & Functionality

From a physical perspective, the i2004 Internet Telephone looks very similar to the sleek design of the M3904 digital Telephone. Leveraging one of the most dramatic enhancements within the M3900 series portfolio, the i2004 contributes to lower total cost of ownership through the elimination of paper labeled key caps. Line and feature keys are conveniently “self-labeled”, meaning that once the phone is configured within the system, the line and feature key labels are automatically presented to the user through the display. Not only does this significantly reduce the initial installation and designation time, it

also reduces ongoing maintenance charges associated with set re-designation when programming changes occur or new features are added. In addition, Moves, Adds, & Changes are further simplified with i2004, as it is not necessary to physically connect the telephone back to a specific hardware port on a line card. The i2004 is powered by a 16 VAC, 500 mA wall transformer connected to the set using a standard barrel connector. Optional 'in line' power through the LAN data connection is possible. Refer to the Frequently Asked Questions (FAQ) section later in this document.

The i2004 set has the following characteristics:-

• Large Multi-line x 24-character LCD display	• Full Duplex Audio
• 6 user-programmable line/feature keys	• Handsfree Speakerphone with LED
• 4 user-programmable soft feature keys that provide access to multiple features	• Voice Activity detection, silence suppression, and echo cancellation
• Integrated headset jack with convenient on/off button	• Automatic IP address assignment via DHCP
• Dedicated Icon Labeled feature keys: Hold, Release, Volume Control, "Smart Mute", Headset with LED, Messages, Services. *	• Dual Purpose LED Indicator: Message Waiting (Solid), Incoming Call (Flashing)
• Meridian M2616 telephone feature set support.	• Navigation Cluster (for viewing display screen)

** Additional advanced application keys are also dedicated for future use: Directory, Expand, Quit, and Copy.*

There are however, certain M3900 series enhancement features that are not currently supported in the initial phase of the i2004 release. As with the M3900 series, the i2004 Internet Telephones will continuously be enhanced to include new features and capabilities in future releases.

Specific M3094 features not currently available on the initial offering of i2004 include:

• Personal Directory	• Expansion Modules
• Call Log & Redial List	• Accessory modules
• Group Listening	• User customizable feature keys
• Hot desking	• Live dial pad
• Context sensitive soft keys	• Wall mount kit
• DN Based Distinctive Ringing	

ACD Feature Set

The i2004 supports the Meridian ACD feature set. There are specific limitations that should be noted if you are using the i2004 in an ACD environment. There are six feature keys on the i2004 Internet Telephone that can be configured for ACD functionality (One for the ACD In-calls key and five others). An additional six feature keys can be accessed by pressing the Outbox / Shift key providing a total of twelve ACD feature keys.

There are a number of differences between the i2004 and traditional ACD telephones. The i2004 does not support the ACD Walkaway feature; therefore if the headset is unplugged ACD Walkaway is not invoked. Also, at the present time, when Call Force is configured on the i2004, calls are presented to the handset not the headset. In addition, the i2004 does not provide a supervisor headset port. Instead, to take over a call, the supervisor can lift the handset on the i2004 Internet telephone, or can listen in on or join a call on the i2004 by using the observe agent feature from the supervisor telephone.

Traditionally supervisors have relied on a range of technologies including ACD sets with key expansion modules to meet their telephony needs and to provide real time information on agent status. IP-based Call Center solutions provide an opportunity to leverage VoIP to provide richer Web-based graphical real-time displays as well as to meet the telephony needs of supervisors.

To provide supervisors with telephony capabilities and access to agent status information, the supervisor uses the i2004 Internet telephone along with Symposium client software installed on the supervisor's PC. Symposium client software provides supervisor PCs with access to graphical real-time capabilities including agent map, billboard, and chart displays. Agent position ID numbers on the agent map can be used in combination with call agent or observe agent features on IP telephones to provide a very effective supervisor solution.

When planning Call Center capacity, in addition to the limits specified for the Call Center applications, it must also be noted that the ITG card has a capacity limited to 1200 calls/ hour/ card.

To configure a system as Non-blocking (as is typically the case for ACD configurations) you would need to ensure only 24 i2004 sets per card are registered.

ITG Line 2.2 Feature Enhancements & Product Improvements

In addition to the existing capability and applications supported by ITG Line that is described in the next section, the following enhancements & product improvements are introduced with ITG Line 2.2

- Use of TCP as the transport protocol on ELAN (Embedded LAN) - reducing the CPU realtime usage on both the call server and the ITGL card.
- Improved ELAN error handling for the link between the card and call server
- RUDP robustness changes to better handle out of order packets
- RTP change that eliminates problem of duplicate packets causing choppy speech
- Other Reliability & robustness improvements (please see additional section on Page 5 that describes improvements on the i2004 and i2050)

Existing ITG Line Capabilities & Applications

Using the i2004 or i2050 Internet Telephones requires the IP Telephony Gateway (ITG) Card with ITG Line application. Each card has 24 ports and supports up to 96 i2004 Internet Phones and/or i2050 software telephones per card.

The ITG card has 24 DSP ports that provide gateway functionality to facilitate the bridging (conversion) of voice streams between the packet switched (IP) data network and the circuit switched PBX network.

In addition, the ITG 2.2 Line card acts as a Terminal Proxy Server or "virtual line card" for the i2004 and i2050. In this capacity the ITG 2.2 Line card is responsible for registering i2004 and i2050 telephones and keeping track of the maximum number of sets that can be registered per card. Utilizing the Meridian Virtual Terminal Number (VTN) software feature, the ITG 2.2 Line card has the capacity to register up to 96 IP telephones per card. The concentration of sets is achieved through the use of Virtual Superloops within the Meridian 1 which are a hybrid of real and PBX phantom superloops.

Virtual superloops map IP set to IP set calls. These types of calls do not require the use of a physical port on the ITG card to define or enable a speech path. In an i2004 to i2004 call scenario, the IP sets transmit and receive voice packets between each other directly over the IP network without using a DSP port on the ITG Line Card.

However, calls made between an i2004 or i2050 set and a traditional telephone (digital set, public telephone network, etc.) will require the dynamic allocation of a physical port on an ITG 2.2 Line card. Within a Meridian 1 system, DSP ports on multiple ITG 2.2 Line cards are pooled resources allowing a port on any card to be dynamically assigned to an i2004 or i2050 telephone on an as needed basis.

On each IP Line card, there is one 10BaseT Ethernet interface connecting the IP Line card to the private Embedded LAN (ELAN) for management and one 10/100BaseT Ethernet interface from the DSP Daughter Board on the IP Line card connecting the IP Line card to the IP network for voice transmission (TLAN or Telephony LAN).

QoS and Bandwidth Management

The use of Meridian ITG Line, Meridian ITG Trunk, and 802.11 Wireless IP Gateway products in the same Meridian Internet Enabled or Succession CSE system is a supported configuration; however an engineering analysis of all aspects of the deployment is necessary to ensure the customer Quality of Service expectations are met.

The ITG Line card supports a range of compression algorithm standards. The Codecs supported are G.711, G.729A, and G.729AB with a variety of packet sizes and number of frames per packet. These compression levels are configurable by the system administrator using either Meridian Administration Tool (MAT) or Optivity Telephony Manager (OTM) to more efficiently manage Quality of Service (QoS) and bandwidth usage. Each i2004 Internet Telephone and ITG port can be assigned to bandwidth management zones by the system administrator to allow selection of codecs and policies to fit the specific implementation.

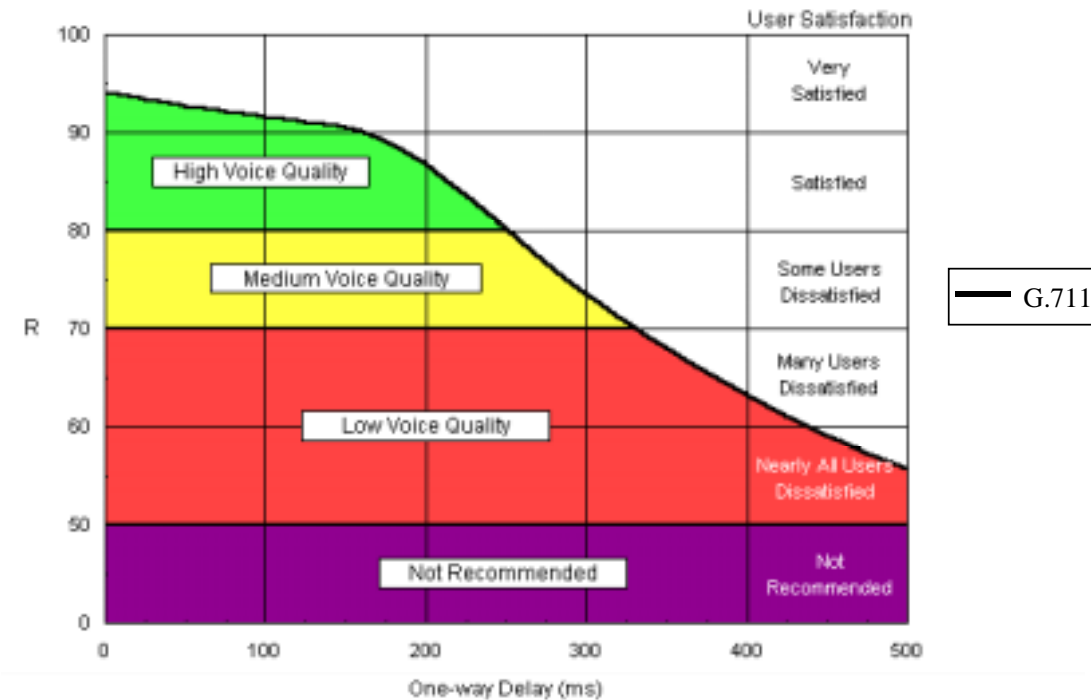
In addition, the i2004 and ITG Line card support standards-based Quality of Service (QoS) with IP Type of Service (TOS) and IETF-defined Differentiated Services (DiffServ), allowing organizations to prioritize and expedite both voice and data traffic on the LAN and ensure clear voice communications throughout the enterprise. Within the ITG 2.2 Line Card NTP, detailed Engineering Guidelines are available to assist administrators with effectively evaluating the network to manage such QoS impacting elements as end-to-end packet delay, and end-to-end packet loss.

The perceived quality of a telephone call is dependent on many factors, such as; codec characteristics, end-to-end delay, packet loss, etc. as well as the perception of the individual listener.

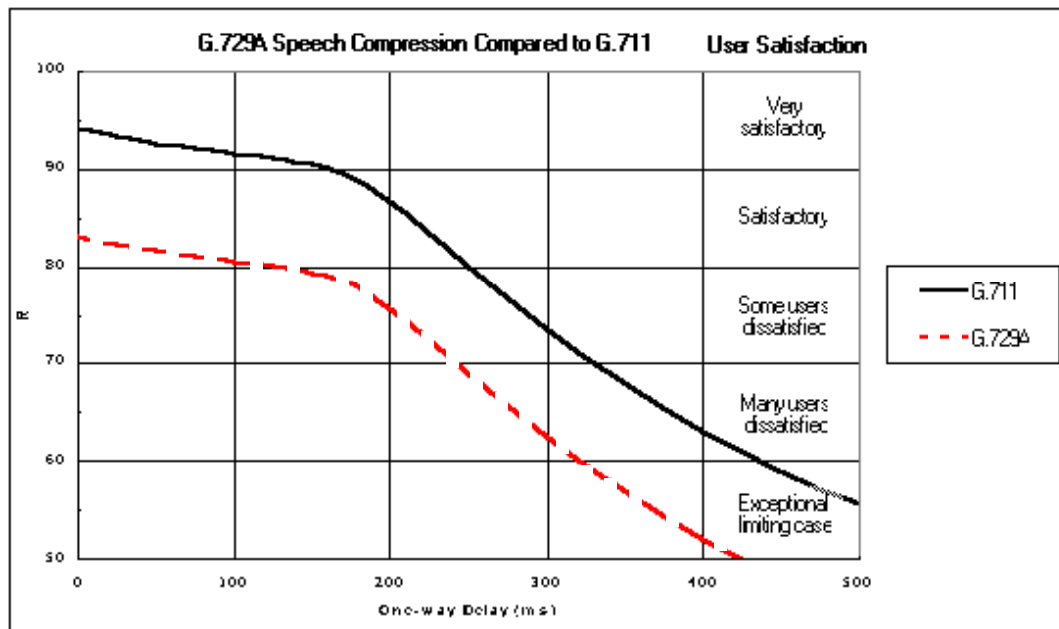
The E-Model Transmission Planning Tool is a model used to produce a quantifiable measure of voice quality based on relevant factors. Refer to two ITU-T recommendations, ITU-T E.107 and E.108 for more information on the E-Model and its application.

The output of the E-Model is a quantity called the “Rating Factor”, or simply *R*. The scale is typically from 50 to 94, where everything below 50 is clearly unacceptable and everything above 94 is unobtainable in narrowband telephony.

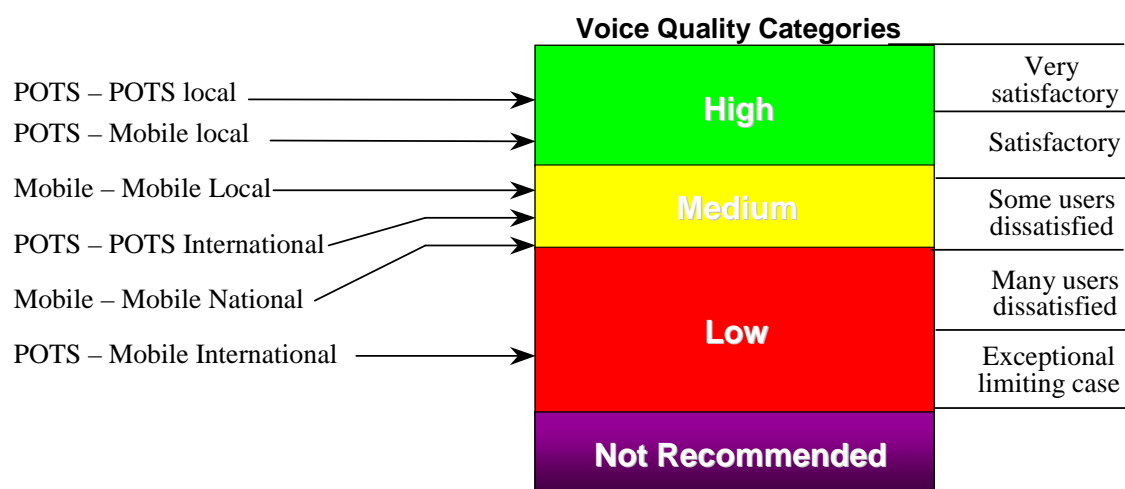
Delay is the most significant impairment in IP telephony. A useful way to show the relationship between delay and user satisfaction is plot a graph with end-to-end delay on the X-axis and *R* on the Y-axis. Using this format, the Figure below shows the curve for G.711 with the Voice Quality Categories below the curve and the “User Satisfaction” categories defined in ITU G.109 on the right-hand side. For example, G.711 drops from the “High” to “Medium” category at about 250 ms (*R* = 80). G.711 has no impairment and this curve represents the best-possible narrowband performance. As you progress along the curve dynamics of conversation begin to break down as the delay affects turn-taking, the ability to interrupt and subtle things like truthfulness, intelligence, and attentiveness. Once introduced, delay cannot be removed.



The next Figure shows the effect of speech compression by comparing the performance of G.729A to G.711. G.729A has a greater impairment, which has the effect of lowering the G.729A curve by relative to the G.711 curve. Think of the Y-axis as the distortion axis. Adding distortion means the one-way delay for a given R is reduced. For instance, at $R = 70$ the delay available to G.729A is about 80 ms less than G.711 and at $R = 80$ the delay available to G.729A is about 120 ms less than G.711. Speech compression means: more distortion, less available delay.



The figure below attempts to show a reference between the voice quality categories and something we are familiar with. The above diagrams are examples that do not account for all of the impairments that



are involved when deploying voice on a data network. When implementing voice over IP it is important to choose the quality that you want and then engineer the complete solution to ensure you get the quality that you choose. There are many factors such as codec, end-to-end delay, packet loss, packet size, jitter, etc. that must be considered to accurately specify the overall network performance. The ITU E-Model is a good method to account for and combine all of the factors in a particular implementation to obtain an objective transmission rating.

Meridian ITG Line, Meridian ITG Trunk, and 802.11 Wireless IP Gateway products will influence overall voice quality and any impairments are additive and therefore careful consideration must be given to all factors that influence voice quality prior to provisioning a solution in a customers network.

Meridian ITG Line 2.2 Packaging, Product Codes, and Price Book

Below is a summary of product engineering code changes for product introductions and content updates.

Description	Old PEC	Old CPC	New PEC	New
i2050 Software Phone CD-ROM	N/A	N/A	NTDW83AA	A0873917
USB Audio Kit	N/A	N/A	NTEX14AA	B0258398
IP line 2.2 Software CD-ROM	NTDW80AB	A0869520	NTDW80AC	A0870172
IP line 2.2 Read Me First Document		P0945820		P0986797
ITG Line NTP & Documentation CD-ROM	NTDW81AB	A0868154	NTDW81AC	A0870183
ITG Line NTP (paper)		P0944086		P0986457
Internet Terminals NTP		N/A		P0986458
ITG Line 2.x Systems Pkg. – NA/CALA/AP	NTZC81AA	A0804146	content update	
ITG Line 2.x Systems Pkg. - EMEA	NTZC81BA	A0839057	content update	
ITG Line 2.x Card - Spare	NTZC80AA	A0804145	content update	
Pentium 24-Port ITG Assembly with ITG Line 2.x Application Load	NTVQ55AA	A0807326	release change	

Price Book

All orderable product codes listed in this Product Bulletin, including the i2004 Internet telephones, i2050 software telephones, and USB Audio Kit are now listed in the Meridian 1 price catalog.

System Package

To simplify the ordering procedure a base system package has been created. This package includes the ITG Card loaded with the Line 2.2 application, required cables, i2004 user guides, software and documentation CD ROMs. These items are found in the Meridian 1 Options 11 – 81C Product Catalog.

This package does not include MAT, OTM, RM356 modem router, i2004 Telephones, i2050 software telephone clients, USB Audio Kits, or headsets. All of these items are ordered separately.

Meridian IP Telephony Gateway – Line 2.x System Package	NTZC81AA/ A0804146
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The following components are part of the ITG Line 2.2 system package, and are also orderable as separate components.

Meridian IP Telephony Gateway Line 2.x card	NTZC80AA/ A0804145
ELAN/ TLAN/ RS232 Ports cable	NTMF94EA/ A0783470
PC Maintenance Cable	NTAG81CA/ A0655007
Meridian 1 100 Mbit I/O Backplane filter	NTCW84JA/ A0783483
I2004 Internet Telephone User Guide – English (24)	P0944087
Meridian IP Telephony Gateway Line 2.x s/w CD ROM	NTDW80AC / A0870172
Meridian IP Telephony Gateway Line 2.2 NTP CD ROM	NTDW81AC/ A0870183
ITGL 2.2 / i2050 / i2004 ReadMe First Document – Paper	P0986797

i2004

There are two boxed versions of the i2004 available; one with a power supply included in the box and one without a power supply. Both versions are packaged with a Telephone footstand, handset, handset cord and Ethernet cable, and Getting Started Card.

The i2004 is currently available in one color – Ethergrey and comes preloaded with software from the factory, however an update to the telephone software is done automatically when the set is initialized . The latest telephone software is distributed as part of the ITG Line 2.2 system package on a CD ROM and is also available from the Meridian Electronic Software Distribution Internet Web site.

The power supply included in the box is a standard North American two prong plug for 117/120 VAC 50/60 Hz. For regions requiring a power supply for a different line voltage/ frequency this may be ordered separately.

i2004 Internet Telephone Boxed (with Power Supply)	NTEX00BA/ B0253074
i2004 Internet Telephone Boxed (without Power Supply)	NTEX00BB/ B0256456

Separately orderable items for use with the i2004

i2004 compatible Headset	A0779338, orderable direct from GNNetcom
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i2050 & USB Audio Kit

The i2050 Software Telephone PC application is delivered to each end-user on an individual CD. The i2050 is easy to install by end-users. Once enabled through a software parameter or port license like the i2004, the i2050 provides access to the same features & functionalities available on the i2004. Use of the USB Audio Kit with the i2050 Software Telephone is required to ensure audio performance and to receive support on this product.

i2050 Software Telephone – Client application	NTDW83AA / A0873917
USB Audio Kit	NTEX14AA / B0258398

USB Audio Kit consists of:

- ✓ USB Audio Adapter
- ✓ Enterprise Telephony grade monaural headset
- ✓ Lower cordset with quick disconnect
- ✓ USB cable
- ✓ User guide
- ✓ Travel bag

Meridian 1 and Succession CSE 1000 Requirements

The ITG 2.2 Line card is supported on Meridian 1 Option 11C Mini, Options 11C, 51C, 61C, 81 and 81C and Succession CSE 1000.

The Meridian 1-X11 software requirement is Release 25.30 or later, with packages 88 (Digital Set Package – DSET) and 170 (Aries Terminal Package – ARIES) enabled. There are several PEPs that are distributed with the X11 software in the form of an MDCS (Manufacture Delivered Customer Solutions) disk. A single ITG card requires two card slots in a Meridian 1 IPE shelf. Please refer to the Generic X11 Release 25.30 or Generic X11 Release 25.40 Software Product Bulletin and associated documentation for complete system requirements.

The Succession CSE 1000 software requirement is Release 1.1.

With Meridian ITG Line 2.2 and Release 25.40 and CSE1000 Release 1.1 it is necessary to purchase and install a new Incremental Software Management (ISM) parameter called **INTERNET TELEPHONES** that licenses the appropriate number of i2004 and/or i2050 Internet Telephones.

For Meridian 1-Internet Enabled, this ISM counter is set to the value ordered by the customer in increments of 1 and will be charged 1 for 1. The default value is zero. It is necessary to increment this counter prior to configuring i2004 telephones. The part numbers for the Internet Telephone software license parameters are:

IP Telephone software parameter – Large System	NTZC82AA
IP Telephone software parameter – Small System (Option 11)	NTZC84AA

For Succession CSE1000, the ISMs are ordered by the customer in increments of 8. The part numbers for the Internet Telephone software license parameters are:

8 Basic Services IP Extensions ISM	NTM450AA
8 Advanced Services IP Extensions ISM	NTM451AA
8 Premium Services IP Extensions ISM	NTM452AA

Expansion 8 Basic Services IP Extensions ISM	NTM453AA
Expansion 8 Advanced Services IP Extensions ISM	NTM454AA
Expansion 8 Premium Services IP Extensions ISM	NTM455AA

System Management

Meridian ITG Line & the i2004 Internet Telephone requires OTM 1.01 or higher. OTM 1.2 is used to configure the i2050, providing both a Station Administration or Web Station interface. OTM 1.2 supports RIs 25.40; MAT does not support RIs 25.40.

For further information on OTM please refer to the OTM General Release Bulletin."

Software Delivery

Meridian ITG Line 2.2 supports software delivery through CD-ROM:

IP Telephony Gateway (ITG) Line 2.2 Software CD	NTDW80AC / A0870172
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The CD-ROM is inserted into the CD-ROM drive of the MAT/ OTM PC and subsequently downloaded to the ITG card.

Meridian ITG Line-side software and related documentation may also be downloaded from the Nortel Networks Support web site. The site can be accessed by going to <http://www.nortelnetworks.com/support> and logging in using the "Log In" option on the left menu. Access the Meridian 1 Internet Telephony section by selecting "View by a Product" option on the right menu, specifying "Meridian Internet Telephony Gateways" in the pull-down menu, and selecting "Save".

For additional information on registering for access to the M1ESD please refer to the Generic X11 Release 25 Software Product Bulletin.

Documentation

Documentation for Meridian ITG Line 2.2 is shipped on a separate CDROM included with the Meridian ITG Line System package. Additional documentation CDROMs as well as paper copies of the NTP are available as separately orderable items. The CD-ROM contains electronic, printable copies of the following documents:

- NTP 204 ITGL 2.2
- NTP 217 Internet Terminals Guide
- i2050 Software Telephone User Guide
- i2050 Installation Guide
- i2004 User Guide
- i2004 Quick Reference Guide
- Readme First doc.

Additional user guides may be purchased using the order codes shown in the previous section.

IP Telephony Gateway (ITG) Line 2.2 NTP & Documentation (CD-ROM)	NTDW81AC / A0870183
ITG Line 2.2 NTP (paper)	P0986457
Internet Terminals NTP	P0986458

Documentation is also available on-line:

<http://www.nortelnetworks.com/documentation>

This site provides public access to end-user documentation, and secure access which can be accessed by distributors and partners for additional product and technical information. A quick search is required by entering the appropriate "Product Family", and by choosing the product name under "Select a Product".

Training and Support

Training

New ITG Line 2.2 content has been added to the "Course 399 - Meridian Internet Telephony Gateway (ITG) Line 2.2/i2050 Software Telephone / i2004 Internet Telephone enhancements". It is a three-day trainer lead session. Call 1-877-662- 5669 or visit <http://www.nortelnetworks.com/td> for more information. The topics covered in course 399 are:

- Define Voice over IP
- List required components for ITG
- Describe LAN environment needed for ITG
- List hardware and software requirements for ITG
- Install and configure an ITG System
- Operate and maintain an ITG System
- Trouble shoot an ITG System

Support

Support services for Meridian ITG Line 2.2 are the same as those provided for Meridian 1 core products.

The Nortel Networks North American Global Network Technical Support (GNTS) (A.K.A. CTAS/ ETAS/ CTS) is dedicated to providing responsive maintenance and administration support to Nortel Networks customers.

The Global Network Training support group is contacted after the resources immediately available to the various Authorized Service Providers (ASPs) have been exhausted during the course of problem identification, diagnosis and resolution.

The following briefly summarizes the product support services that Nortel Networks North American CTS organizations typically provide.

- Telephone support, 7 AM to 6PM CST, 5 days a week.
- Remote diagnostic assistance with failed hardware.
- Remote diagnostic assistance with system error and event logs, and operational measurements.
- Remote diagnostic assistance and support for the features of a particular release of generic software for a fixed period as part of the product's basic warranty.
- Remote software support for clarification of documentation, and software Performance Enhancement Packages (PEPs).

To provide optimum service the Global Customer Care organization requires a configuration using the Bay Networks Netgear RM356 modem router (or similar) to enable support of the IP Line Card. For detailed instructions on installation of the RM356 modem router refer to the Meridian ITG Line 2.2 NTP and the user documentation for the RM356.

Technical Specification

Meridian 1 Compatibility:	Meridian 1 Options 11C Mini, 11C, 51C, 61C, and 81C* * includes all CP3, CP4, CPP
Succession CSE Compatibility	Succession CSE
Line Card Port Capacity	24 ports per card; Single card supports up to 96 configured i2004 / i2050 users
Max. # Line Cards per System Option 11C, 11C Mini: Options 51C – 81C	8 ITG Line Cards; Supports up to 640 i2004 users Based on CPU Real-time Capacity see the following section on System Performance for additional information
Physical Location:	Meridian 1 IPE shelf, occupying 2 IPE slots
Software Requirements:	X11 Release 25.30 or later with packages 88 (Digital Set Package – DSET) and 170 (Aries Terminal Package – ARIES) enabled. X11 Release 25.40 or later or CSE 1000 Release 1.1 is required for i2050 Software Telephone, the shift key functionality, and to use TCP as the transport protocol on the ELAN.
ISM Software Parameters:	One ISM Parameter must be purchased for every i2004 Internet Telephone and i2050 Software Telephone supported by a Meridian 1 system or Succession CSE1000.
System Administration:	Requires MAT 6.67 or later or OTM 1.0 or later. I2050 configuration is managed through OTM 1.2. OTM 1.2 supports RIs 25.40 – MAT does not support RIs 25.40. Alarm Management required to view SNMP alarm traps
Supported Codecs:	G.711, G.729A, G.729AB
PC Card:	8MB capacity Flash card (optional)
Environmental Requirements:	Same as Meridian 1 equipment

Meridian 1 Interfaces:	Ethernet Voice Port, Ethernet Management Port, Serial Management Port, DS-30 Signaling, Card LAN
LAN Connectivity:	10/100 BaseT for i2004 connection to LAN; 10/100 BaseT connection for ITG card to TLAN for voice transmission; 10 Base T connection for ITG card to ELAN for administration; 10 BaseT connection from the Meridian 1 to the router (IP version 4)
Power Requirements:	16 VAC, 500 mA wall transformer for the i2004 telephone, or through Internet Telephone Switch Module, or through Power over LAN Hub™

System Capacity

While few systems reach the maximum capacities listed for fully expanded systems, it is important to provide capacity guidelines for Meridian 1 systems on a range of call processors. It is well documented that the largest 8 group 81C with Call Processor Pentium can support 16,000 ports, including analog and digital telephones. With the introduction of the i2004/ i2050, it is likely that IP phones will provide a portion of the total mixture of terminals on any system. Nortel Networks intends to be conservative in its initial recommendations with the expectation of increasing system capacities gradually until the full complement of any set-type (IP, digital or analog) in any combination can be deployed to documented maximum system capacities.

ITG cards per system capacity- each card requires two slots. Maximum ITG Card limit is determined by IPE slot usage

i2004 / i2050 Internet Telephones per card – Maximum of 96 sets supported per card

i2004 / i2050 Internet Telephones per system –The Option 11C or 11C Mini will initially support 640 i2004 / i2050 Internet Telephones

The capacity for larger systems is typically determined by engineering traffic capacity and IPE slot usage, however the following guidelines must be used initially for system configurations.

CP 2	640	CP3	1000
CP 4	1000	Pentium II	2000

i2004 / i2050 Internet Telephones per Succession CSE1000 system – CSE 1000 RIs 1.1 supports 640 i2004 / i2050 Internet Telephones

Mean Time Between Failure (MTBF)

The ITG Line 2.2 card Mean Time Between Failure (MTBF) is 46 years. Failures per 10⁶ hours of operation are 2.483, based on 40 degrees C (140 degrees F).

Warranty, Repair and Return

Existing Warranty, Repair and Return policies for M1 core product apply. Detailed information on warranty, repair and return can be found in the price book for your region.

Frequently Asked Questions (FAQs)

Does the i2004 support a hub for sharing workstations at the desktop?

The i2004 supports the Internet Telephone Switch Module which is a 10/100Base T, Layer 2 data switch that conveniently slides into the back of the i2004 footstand into an accessory bay and provides hardware prioritization for voice traffic. This accessory will provide an additional RJ 45 jack allowing a PC to be connected at the same source, requiring only a single Category 5 Ethernet connection to the desktop.

Will i2004 support LAN powering?

Yes, currently Nortel Networks is actively participating at IEEE 802.3af to work towards an approved industry standard for LAN powering. Until a standard is approved, the i2004 will support a modular approach that will protect customers' investments during this pre-standard period. A Power over LAN Hub™ is generally available now to provide power to the IP telephones over the LAN. The Power over LAN Hub™ also powers the i2004 and Internet Telephone Switch Module when used together. The Power over LAN Hub™ power is AC powered and will provide remote loop powering to the i2004 Internet telephone, and to future phones in the portfolio. The module will support 24 phones and will fit as standard equipment into wiring closet equipment racks. A back up power source for the wiring closet is recommended to provide telecom reliability through power outages.

How is Quality of Service handled?

Quality of Service is controlled by setting the Differentiated Service (DiffServ) field in the IP header for both the ITG Line Card and the i2004 Internet Telephone. The DiffServ code point or Type of Service (TOS) byte determines the priorities of the management and voice packets in the ITG network. While the default value for both parameters is set at 0, the system administrator can configure the DiffServ/TOS value using MAT or OTM, to obtain better QoS over the IP data network.

How will E911 be handled for i2004?

E911 information and notification can be handled in the same manner as digital sets. However due to the nature of the data network connection it is easier to move a set without technician intervention. Nortel Networks is actively participating in industry special interest groups working to define a strategy for resolving the issues surrounding E911 and IP Telephony. Until a strategy is defined, when a user relocates an i2004 set, the set location database will need to be updated and maintained by the system administrator.

What are the recommendations for a DHCP Server?

A standard Dynamic Host Control Protocol (DHCP) Server will support the i2004 Internet Telephone. A DHCP server provides the necessary information for the i2004 to enable its connection to the network and other components such as the ITG Line Card. The i2004 has been tested with the Microsoft Windows NT 4, ISC DHCP Distribution, and Sun Solaris 2 servers. However Administrators are expected to choose the most suitable server that best fits the needs of their network architecture and requirements in conjunction with the i2004.

Can i2004 be supported in residential environments for Telecommuters?

The i2004 has been tested and complies with EMC specifications as Class A equipment. For a residential environment EMC Class B is required. The i2004 will be available to meet Class B in 2002.

What is the capacity of an ITG card?

The ITG card with the Line application can support up to 1200 calls/ hour / card.

Enterprise Solutions

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